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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,997	11/13/2001	Kenji Orita	740819-617	6386

22204 7590 02/16/2005

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EXAMINER

PHAM, LONG

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 09/986,997	Applicant(s) ORITA ET AL.	
	Examiner Long Pham	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 39-43 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-15 is/are allowed.
- 6) ☒ Claim(s) 39-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/21/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Rejections and/or objections necessitated by the amendments

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
2. Claims 39-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original disclosure does not have support for “after introducing the substrate into a vacuum chamber, charging plasma into the vacuum chamber to form an ambient of plasma while keeping the temperature of the substrate without heating the substrate”.
3. The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 39-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 39, step c), it is unclear how the substrate is exposed to plasma (inherently a form of heat or carries heat) and not exposing substrate to heating at the same time?

Rejections and/or objections as previously applied

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this present application in view of Isamu et al. (Japan 02257679) (a reference of record) and Shih et al. (US '320) (a reference of record).

The applicant's admitted prior art teaches a method for fabricating a semiconductor device, comprising the steps of (see col. 1, line 5 to col. 2, line 61 of the Background and figure 10 of the patent no. 6,117,700):

a) forming a semiconductor layer 104 of a group III nitride containing a dopant over a substrate 101, wherein the dopant includes magnesium (Mg), zinc (Zn), calcium (Ca), strontium (Sr), and beryllium (Be);

b) forming a p-side electrode out of a metal on the semiconductor layer, wherein the metal includes nickel and gold; and

c) exposing the semiconductor layer to plasma at temperature, thereby making the conductivity type of semiconductor layer p-type.

The applicant's admitted prior art teaches exposing the semiconductor layer to plasma for activating the p-type dopant at a temperature, but fails to teach annealing temperature range of 600°C or less as recited in present claim 39.

Isamu teaches a method of making a gallium nitride compound semiconductor light-emitting device in which a group III nitride containing a dopant is exposed to heat at a temperature of 600°C or less. See the English abstract and figure 5.

It would have been obvious to ***one of ordinary skill in the art of making semiconductor devices*** to expose the group III nitride containing a dopant to heat at temperature of 600°C or less in the method of the applicant's admitted prior art because in doing so the optical characteristics of the device are improved without changing electrical characteristics. See the English abstract.

The applicant's admitted prior art teaches performing plasma heating after the formation of the semiconductor layer 104 of a group III nitride containing a dopant, but fails to teach that the plasma heating is done in the presence of nitrogen.

Shih teaches a method of forming a semiconductor layer in which a semiconductor layer of a group III nitride containing a dopant is annealed by nitrogen plasma. See the abstract.

It would have been obvious to ***one of ordinary skill in the art of making semiconductor devices*** to anneal the semiconductor layer 104 of a group III nitride containing a dopant by nitrogen plasma in the method of the applicant's admitted prior art because in doing so the unwanted defects caused by high temperature process are prevented. See the abstract.

3. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this present application in view of Isamu

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et al. (Japan 02257679) and Shih et al. (US '320) as applied to claims 39 and 40 above, and further in view of Nagao (Japan 58100471).

The applicant's admitted prior art teaches forming the p-side electrode out of metal on the semiconductor layer, but fails to teach that the metal is aluminum as recited in present claims 41-43.

Nagao teaches a method of making a light-emitting diode in which the p-side electrode is made of aluminum. See the English abstract.

It would have been obvious to *one of ordinary skill in the art of making semiconductor devices* to form the p-side electrode from aluminum in the method of the applicant's admitted prior art because in doing the life and reliability of the device is improved. See the English abstract.

Response to Arguments

4. Applicant's arguments filed 12/21/04 have been fully considered but they are not persuasive. See below.

In response to the applicants' arguments in paragraphs on pages 6, 7, and 8 of the amendment dated 12/21/04, it is submitted that the applicant's admitted prior art of this present application in view of Isamu et al. and Shih et al. teaches the inventions of claim 39 and 40. See the rejection.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

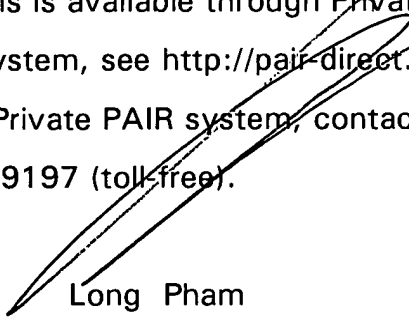
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calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on M-F, 7:30AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Long Pham
Primary Examiner
Art Unit 2814

LP